

Providing Forecasts to Customers and Users

NWS Workshop on Hydrologic Forecasting
Prague Campus
Czech University of Agriculture
June 20-24, 2005

David Brandon
Hydrologist in Charge
Colorado Basin River Forecast Center
National Weather Service



Customers and Users

Number 1
Priority !





Forecast Distribution

- Through Weather Forecast Offices
- Web Pages
- FTP Servers
- Email
- Telephone



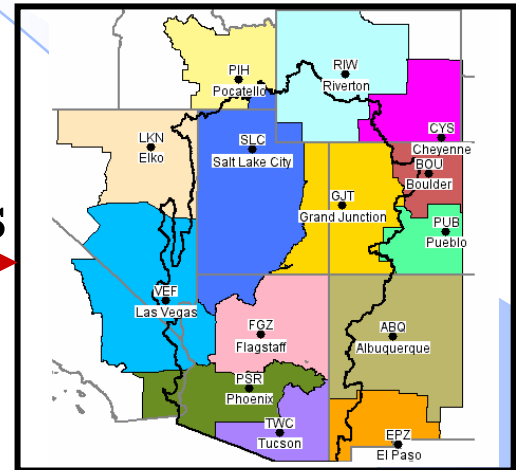


Forecast Distribution - River Forecast Centers To Local Weather Offices To the Local Emergency Managers/Press To the Public



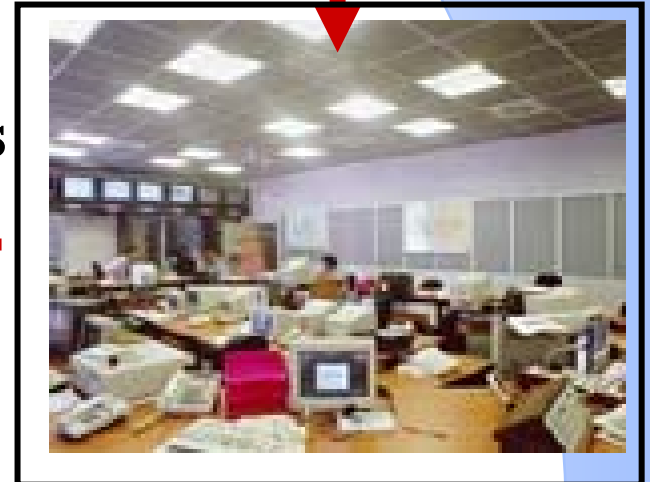
RFCs

WFOs



Public

**Managers
Press**





Forecast Distribution – Web Pages

Advantages

Widespread Access

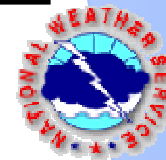
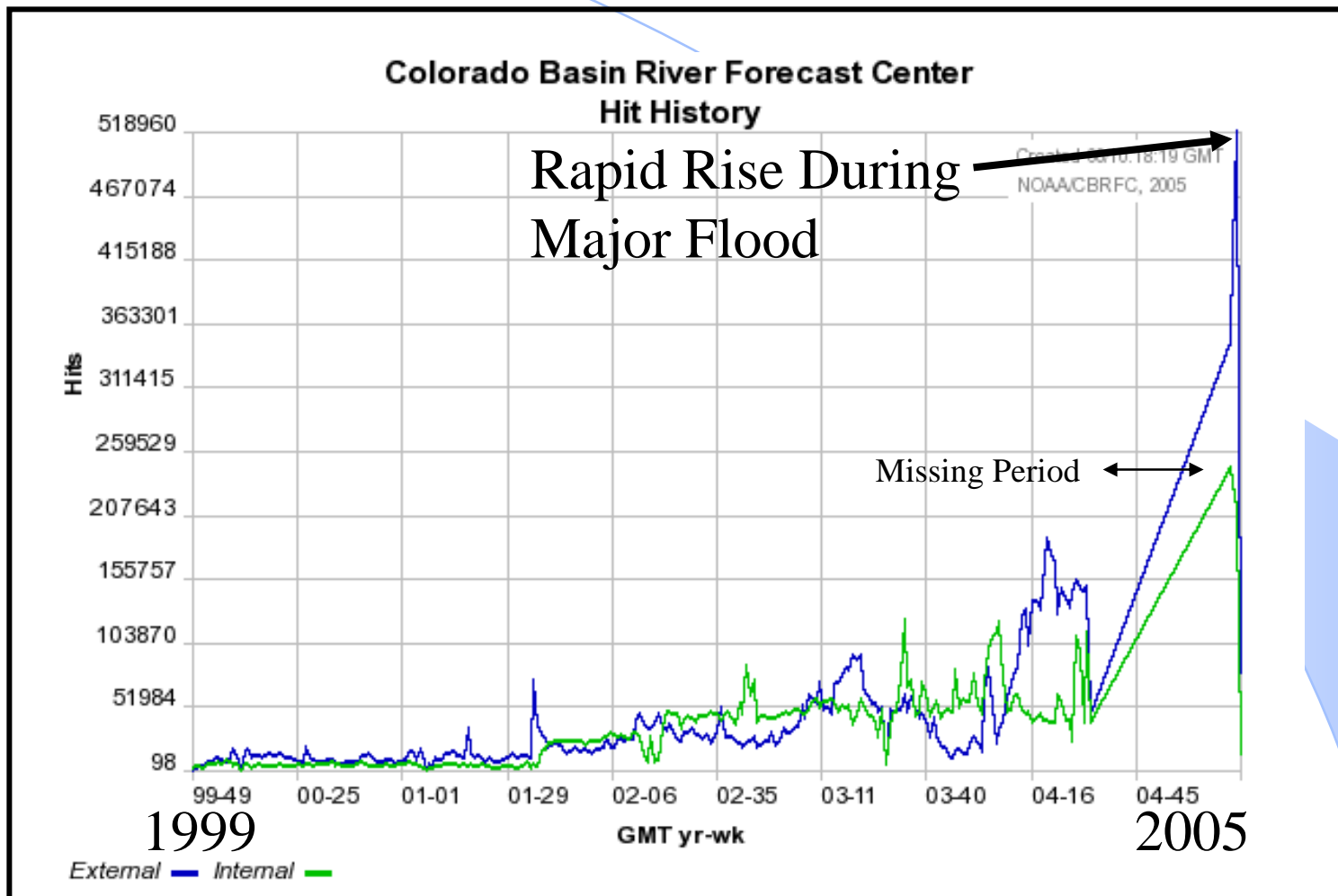
Interactive Graphics

Easy To Update

Provides Much Information



Growth In Users For Web Page – 1999 - 2005



WEB Page – Interactive Capabilities

Web Page Concepts

Build Products From Database

Build Your Own Products

Visual Alerting Capability

Customize to Individual Users

Provide Many Interactive Options



Main Display on First Page:

Important areas of hydrologic activity are highlighted.

Solid colors are observed

Striped colors are forecast -----

Quickly discern areas of interest

Click on any point and zoom in

for more detail -----

Make a quick plot of a hydrograph ---

Toggle on/off various display options

Search/display by river name or station name -----

List only stations that are currently color coded -----

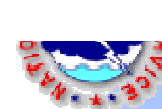
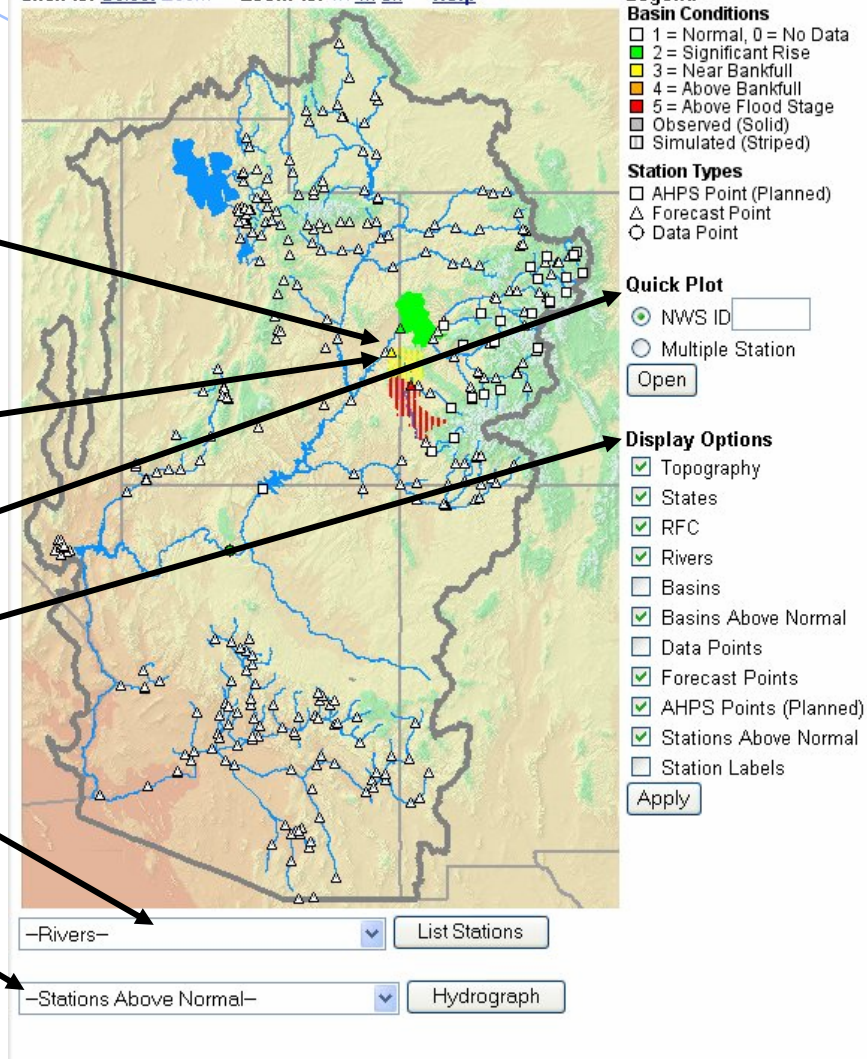
Conditions are automatically updated

River Forecasts & Data

In winter months erroneous stage data is more prevalent and may have a substantial influence in forecast simulations.

Legend. Map data updated 01/06.19:33 GMT, 01/06.12:33 MST. Click map to zoom.

Click to: [Select Zoom](#) Zoom to: 1x 4x 8x [Help](#)



River Forecasts & Data

In winter months erroneous stage data is more prevalent and may have a substantial influence in forecast simulations.

Legend, Map data updated 01/06:19:33 GMT, 01/06:12:33 MST. Click map to zoom.

Click to: [Select](#) [Zoom](#) [Zoom to: 1x 4x 8x](#) [Help](#)

- Legend**
- Basin Conditions**
- 1 = Normal, 0 = No Data
 - 2 = Significant Rise
 - 3 = Near Bankfull
 - 4 = Above Bankfull
 - 5 = Above Flood Stage
 - Observed (Solid)
 - Simulated (Striped)
- Station Types**
- AHPS Point (Planned)
 - Forecast Point
 - Data Point

- Quick Plot**
- NWS II
 - Multiple
- [Open](#)

- Display Of**
- ☒ Topogr
 - ☒ States
 - ☒ RFC
 - ☒ Rivers
 - ☒ Basins
 - ☒ Dams
 - ☒ Forecast
 - ☒ AHPS
 - ☒ Station
 - ☐ Station
- [Apply](#)

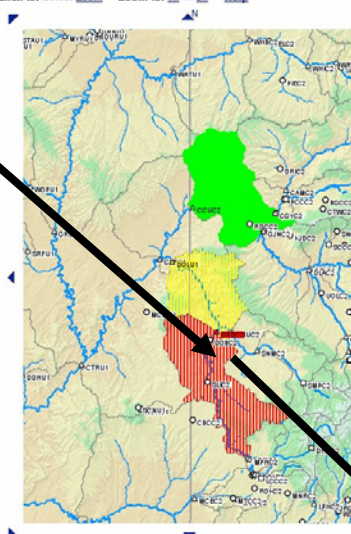
-Rivers- [List Stations](#)

-Stations Above Normal- [Hydrograph](#)

River Forecasts & Data

Legend, Map data updated 01/06:19:33 GMT, 01/06:12:33 MST. Place cursor over point for info, click point to select.

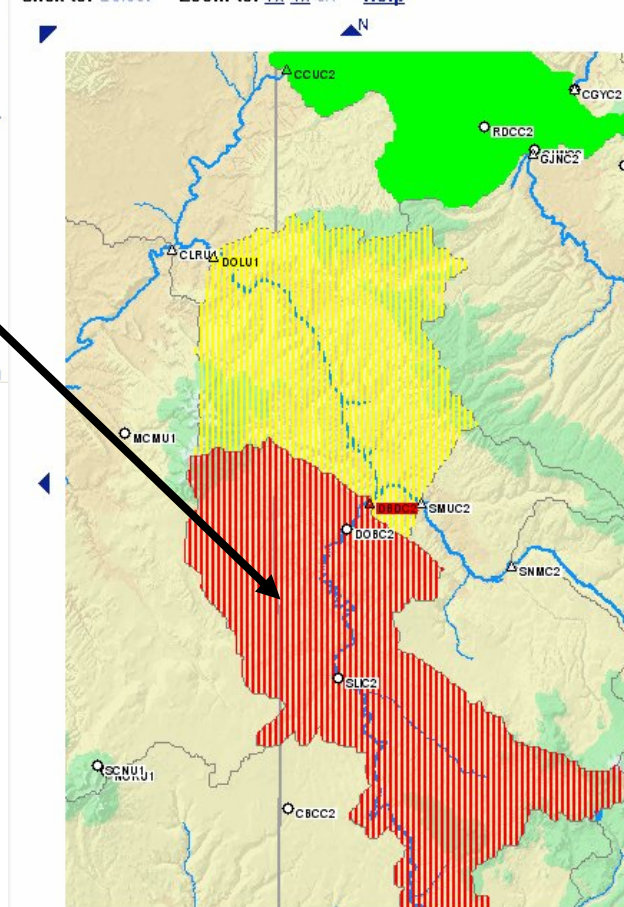
Click to: [Select](#) [Zoom](#) [Zoom to: 1x 4x 8x](#) [Help](#)



River Forecasts & Data

Legend, Map data updated 01/06:19:33 GMT, 01/06:12:33 MST. Place cursor over point for info, click point to select.

Click to: [Select](#) [Zoom](#) [Zoom to: 1x 4x 8x](#) [Help](#)



Locator



Point Info/Search

Station Name

River

NWS ID

Condition

Flow (cfs)

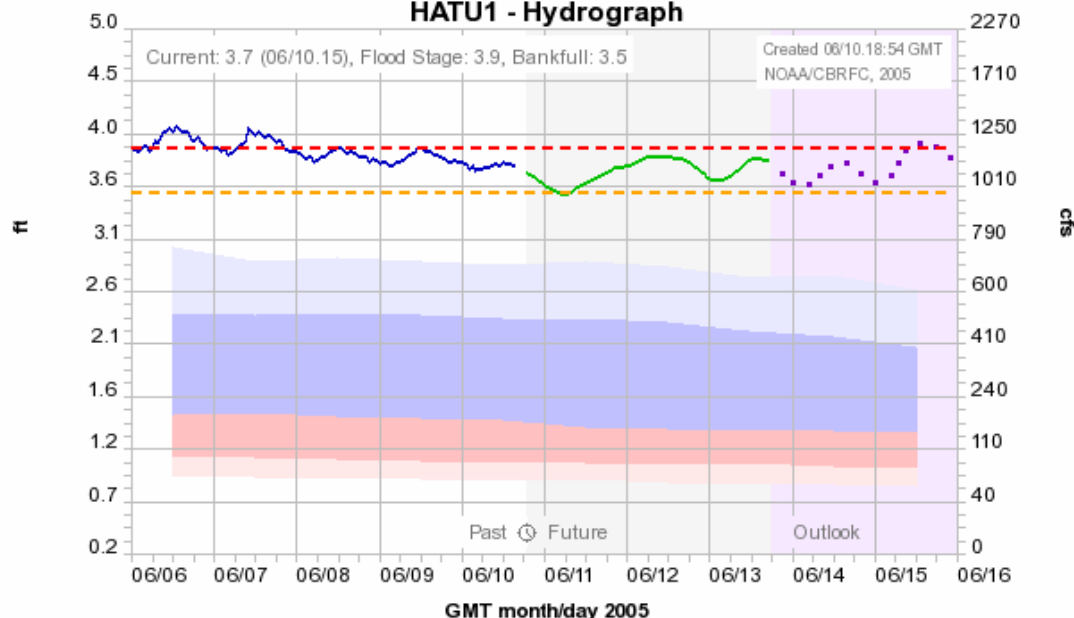
Stage (ft)

[Search](#)



Colorado Basin River Forecast Center

HATU1 - Hydrograph



Observed — Forecast (06/10.18:00) — Outlook (increasing uncertainty) — Bankfull 3.5 — Flood 3.9 —
Historical Exceedance Probability (USGS): 90-75% 75-50% 50-25% 25-10%

Hydrograph Options

<input type="checkbox"/> Critical Stages	Years	Date
<input type="checkbox"/> Simulated	1940	06/10/05
<input type="checkbox"/> Raw Data	1941	Past Days
<input type="checkbox"/> Six Hour	1942	5
<input type="checkbox"/> Linear Flow	1943	Future
<input type="checkbox"/> Historical Peak	1944	5
<input type="checkbox"/> Yearly Peaks	1945	ESP
<input type="checkbox"/> Daily Maxima	1946	Off
<input checked="" type="checkbox"/> Statistics	1947	Analog Years
<input type="checkbox"/> Contingency	1948	Off
<input type="checkbox"/> Adjust		Analog Years Period
<input type="checkbox"/> Requary		Off
<input type="checkbox"/> Forecasts		

Apply and Redisplay

Graphs

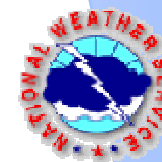
<input type="checkbox"/> Precipitation	<input type="checkbox"/> Temperature
<input type="checkbox"/> Temperature	<input type="checkbox"/> Freezing Level
<input type="checkbox"/> Freezing Level	<input type="checkbox"/> Snow
<input type="checkbox"/> Snow	<input type="checkbox"/> Soil Moisture
<input type="checkbox"/> Soil Moisture	<input type="checkbox"/> Rating Table
<input checked="" type="checkbox"/> Hydrograph	<input type="checkbox"/> Critical Stages

Tabular Data

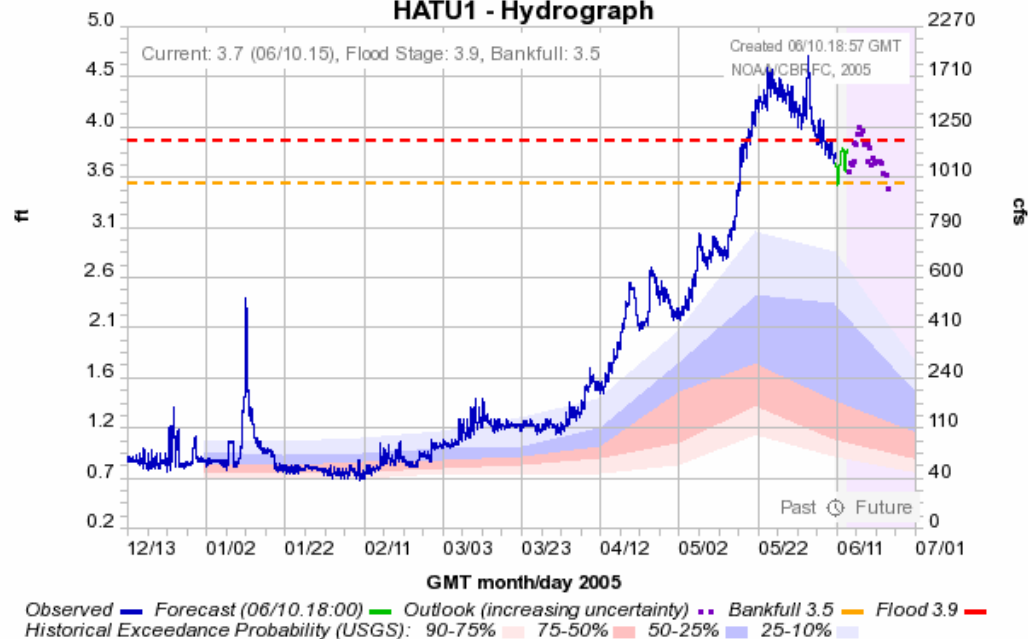
<input type="checkbox"/> Precipitation
<input type="checkbox"/> Temperature
<input type="checkbox"/> Freezing Level
<input type="checkbox"/> Snow
<input type="checkbox"/> Soil Moisture
<input type="checkbox"/> Rating Table
<input type="checkbox"/> Critical Stages
<input type="checkbox"/> Peaks
<input type="checkbox"/> Flows

Information

<input type="checkbox"/> Gage Info
<input type="checkbox"/> Basin/Location Maps
<input type="checkbox"/> Aerial/Topo 16 mpp
<input type="checkbox"/> Photos



Colorado Basin River Forecast Center HATU1 - Hydrograph



Hydrograph Options

<input type="checkbox"/> Critical Stages	Years	Date
<input type="checkbox"/> Simulated	1940	06/10/05
<input type="checkbox"/> Raw Data	1941	Past Days
<input type="checkbox"/> Six Hour	1942	180
<input type="checkbox"/> Linear Flow	1943	Future Days
<input type="checkbox"/> Historical Peak	1944	20
<input type="checkbox"/> Yearly Peaks	1945	ESP
<input type="checkbox"/> Daily Maxima	1946	Off
<input checked="" type="checkbox"/> Statistics	1947	Analog Years
<input type="checkbox"/> Contingency	1948	Off
<input type="checkbox"/> Adjust		Analog Years Period
<input type="checkbox"/> Requery		Off
<input type="checkbox"/> Forecasts		

Apply and Redisplay

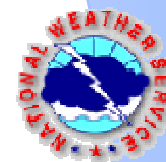
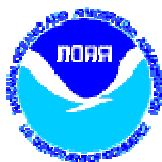
<input checked="" type="checkbox"/> Precipitation	<input type="checkbox"/> Temperature	<input type="checkbox"/> Freezing Level
<input checked="" type="checkbox"/> Snow	<input type="checkbox"/> Soil Moisture	<input type="checkbox"/> Rating Table
<input checked="" type="checkbox"/> Hydrograph		

Tabular Data

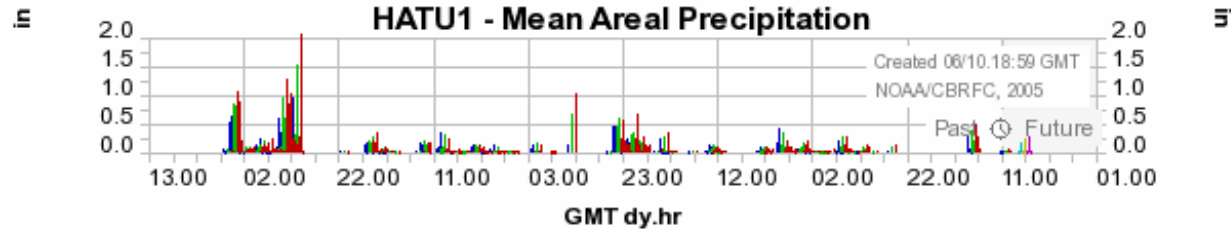
<input type="checkbox"/> Precipitation	<input type="checkbox"/> Temperature	<input type="checkbox"/> Freezing Level
<input type="checkbox"/> Snow	<input type="checkbox"/> Soil Moisture	<input type="checkbox"/> Rating Table
<input type="checkbox"/> Critical Stages	<input type="checkbox"/> Peaks	<input type="checkbox"/> Flows

Information

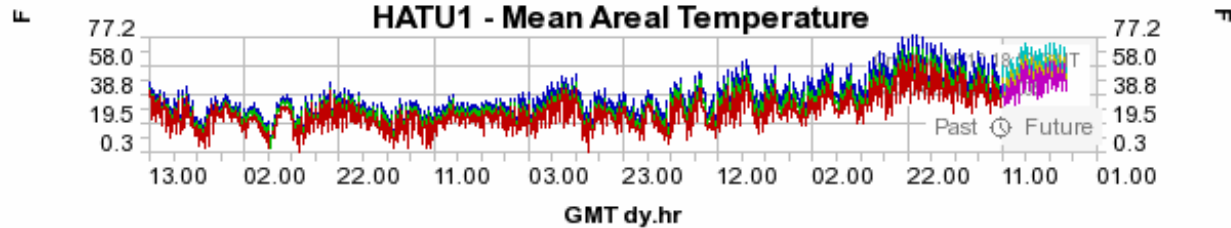
<input type="checkbox"/> Gage Info	<input type="checkbox"/> Basin/Location Maps	<input type="checkbox"/> Aerial/Topo	<input type="checkbox"/> Photos
		16	mpp



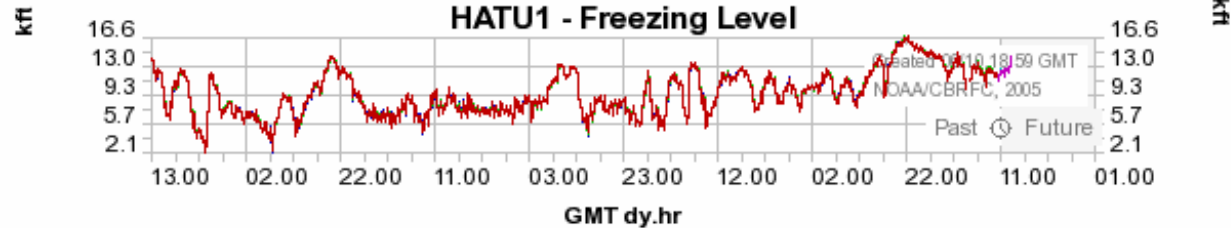
Colorado Basin River Forecast Center HATU1 - Mean Areal Precipitation



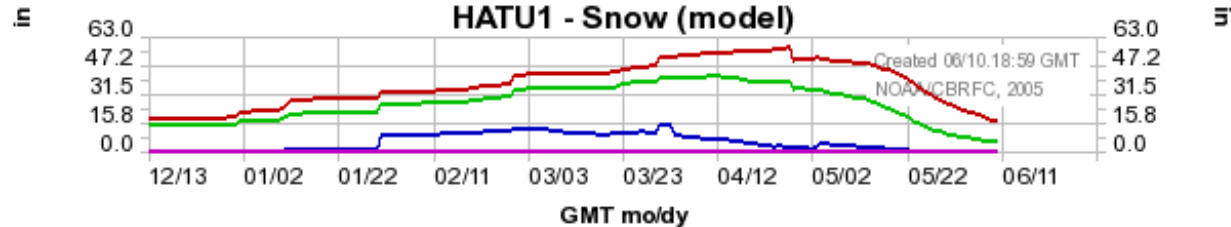
Colorado Basin River Forecast Center HATU1 - Mean Areal Temperature



Colorado Basin River Forecast Center HATU1 - Freezing Level

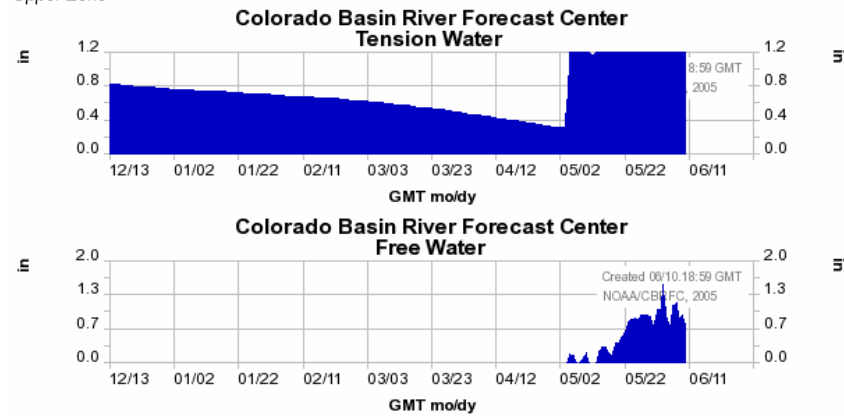


Colorado Basin River Forecast Center HATU1 - Snow (model)

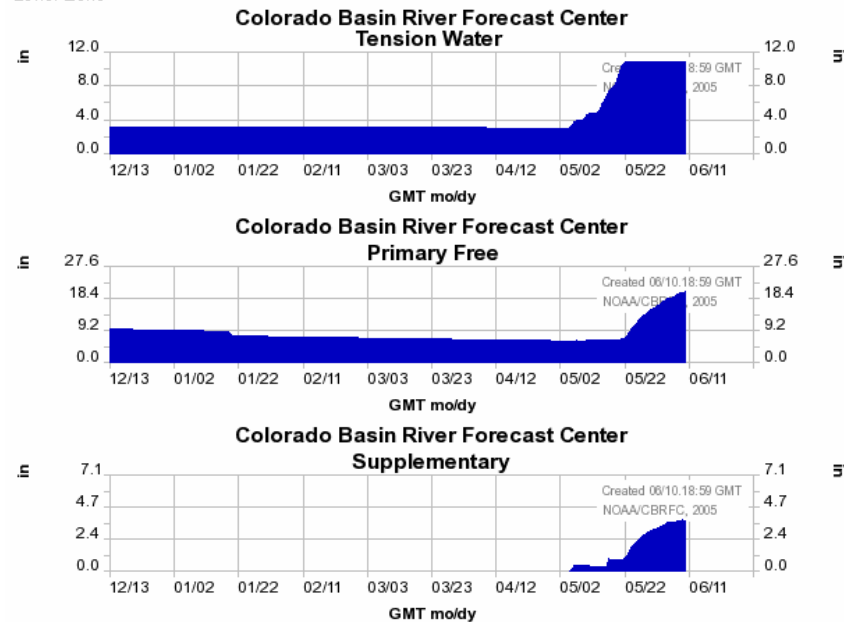


Upper Area Soil Moisture (model, elev 10000 -10332)

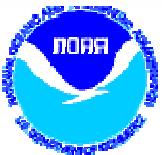
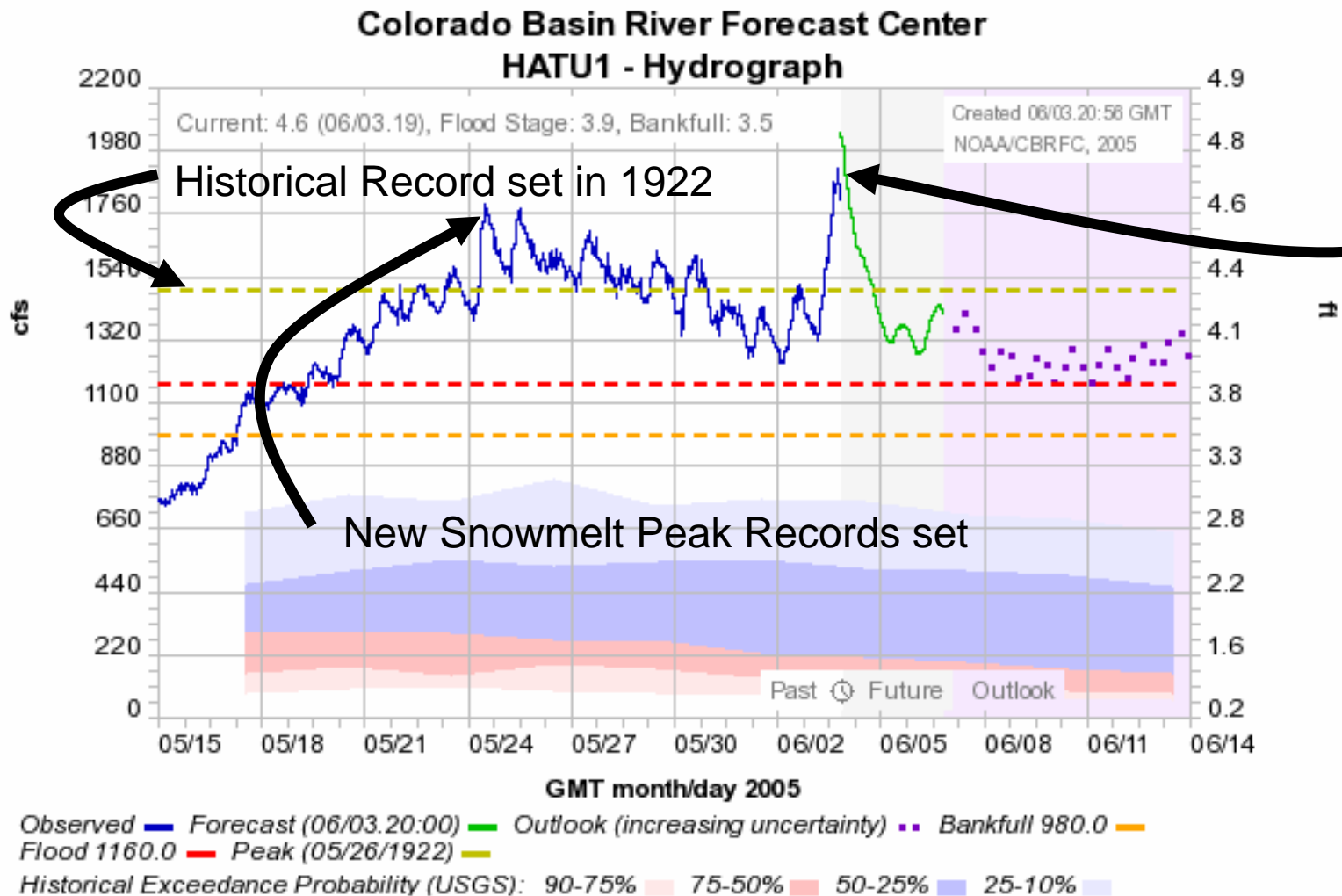
Upper Zone



Lower Zone



Then This Rainfall Peak Came



Advanced Hydrologic Prediction Service Prototype Interface

The screenshot displays the website for the National Weather Service Colorado Basin River Forecast Center. The header features the NOAA logo and the text "NATIONAL WEATHER SERVICE" and "Colorado Basin River Forecast Center". Below the header is a navigation bar with links for "Home", "News", "Organization", and a "Search" field with a "Go" button. On the left side, there is a sidebar with the heading "River Forecasts & Data" and links for "Graphic", "List", "RCYC2 Data", "Hydrograph", and "RCYC2 Gage Info". The main content area contains a grid of seven buttons. The first four buttons are blue and labeled "Hydrograph", "Stage", "Flow", and "Volume". The last three buttons are yellow and labeled "Stage", "Flow", and "Build a Product". Below each button is a text label: "River Level Forecast Info" for Hydrograph, "Weekly Chance of Exceedance" for Stage, "Chance of Exceedance During Entire Period" for Flow, and "Build a Product" for Build a Product. Arrows point from the bottom of the page to each of these seven buttons. The first arrow is green, and the others are blue or yellow.

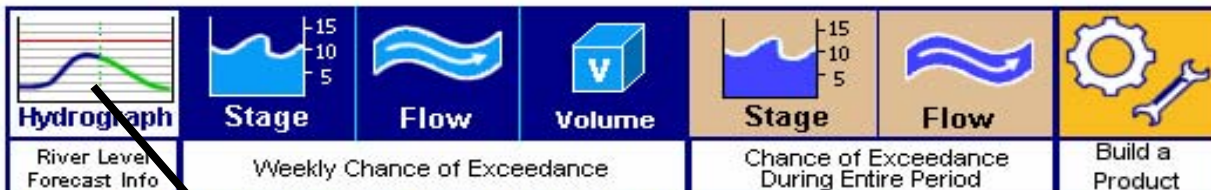
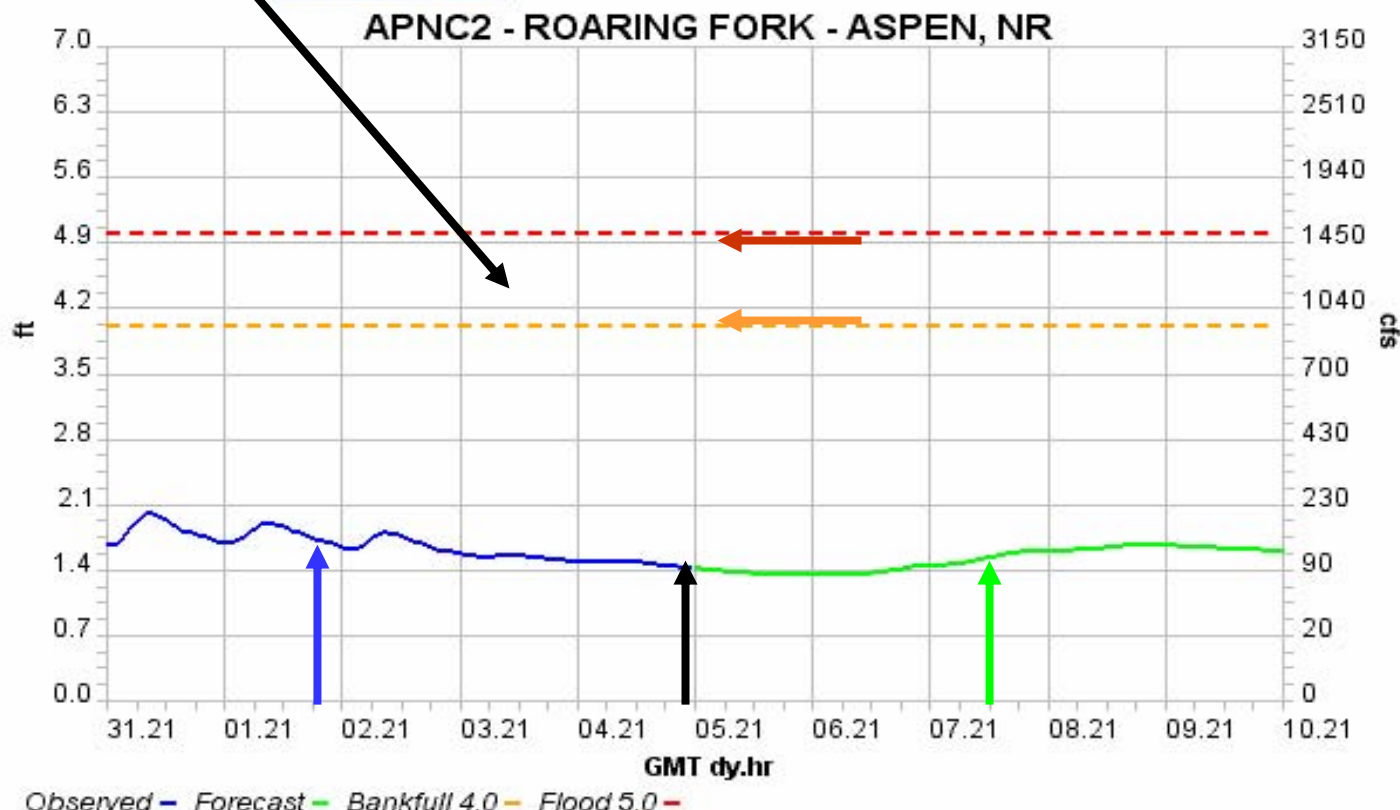
Hydrograph	Stage	Flow	Volume	Stage	Flow	Build a Product
River Level Forecast Info	Weekly Chance of Exceedance	Chance of Exceedance During Entire Period				Build a Product





NATIONAL WEATHER SERVICE

Colorado Basin River Forecast Center

[Home](#)[News](#)[Organization](#)Search [Go](#)**River Forecasts & Data**[Graphic](#)[List](#)**APNC2 Data/Forecasts**[Hydrograph](#)[Probabalistic](#)[Water Supply](#)**APNC2 Model Data**[Precipitation](#)[Temperature](#)[Freezing Level](#)[Snow Information](#)[Soil Moisture](#)[Combination Plot](#)**APNC2 Gage Info**[Conditions Map Location](#)[Basin/Location Maps](#)[Aerial Photos/Topo Maps](#)[Photos](#)[Gage Information](#)[Records](#)[Rating Table](#)**APNC2 Verification**[Short Range](#)[Long Range \(ESP\)](#)[Water Supply](#)[Model Simulation](#)[Back to Main Menu](#)**APNC2 Observed/Simulated Hydrograph**The current time is: [06/05.21:22 GMT](#).

Colorado Basin River Forecast Center, NWS/NOAA

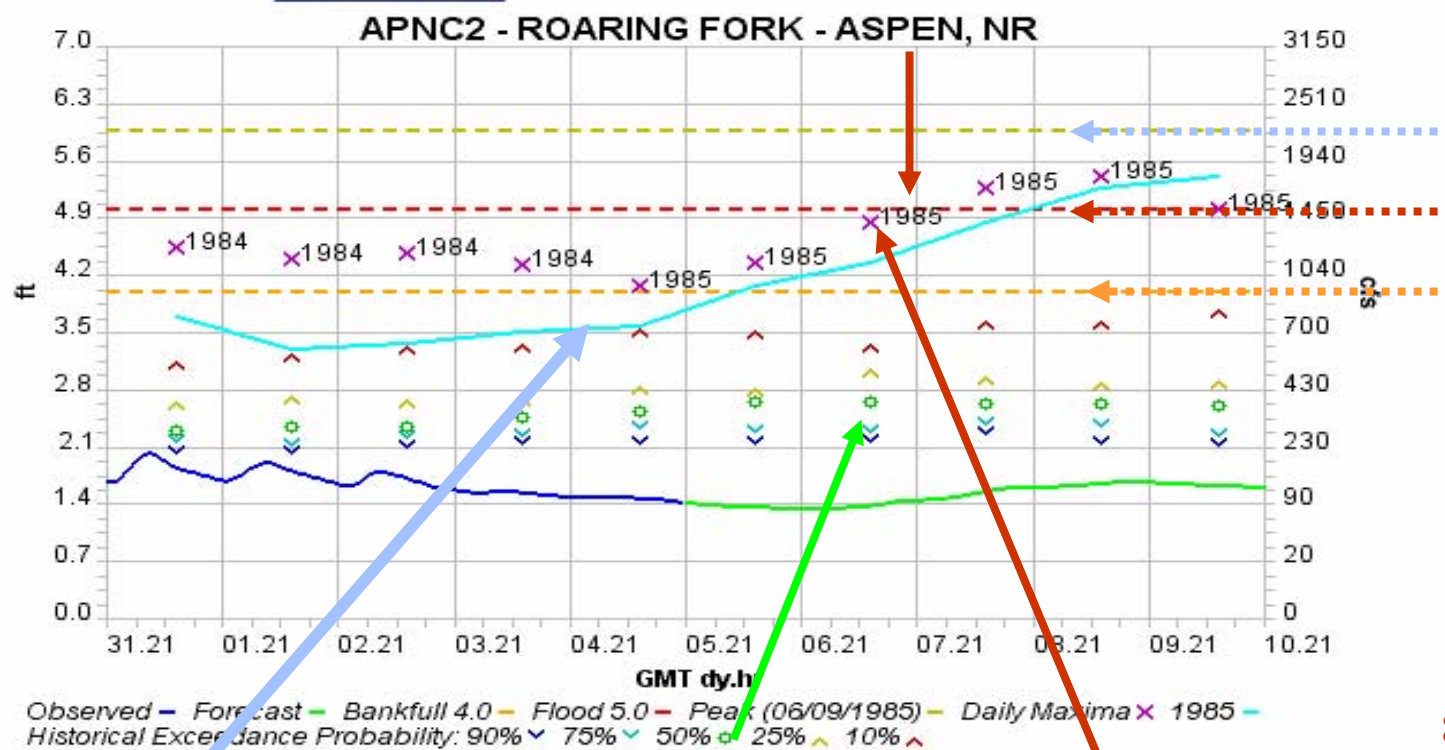
[Hide Flood Stage](#) | [Show Simulated](#) | [Linear Flow](#) | [Show Historical Peak](#) | [Show Daily Maxima](#) | [Show Statistics](#) |

[Home](#)[News](#)[Organization](#)Search [Go](#)**River Forecasts & Data**Graphic
List**APNC2 Data/Forecasts**Hydrograph
Probabilistic
Water Supply**APNC2 Model Data**Precipitation
Temperature
Freezing Level
Snow Information
Soil Moisture
Combination Plot**APNC2 Gage Info**Conditions Map Location
Basin/Location Maps
Aerial Photos/Topo Maps
PhotosGage Information
Records

Rating Table

APNC2 VerificationShort Range
Long Range (ESP)
Water Supply
Model Simulation[Back to Main Menu](#)**APNC2 Observed/Simulated Hydrograph**

The current time is: 06/05.21:47 GMT.


[Hide Flood Stage](#) | [Show Simulated](#) | [Linear Flow](#) | [Hide Historical Peak](#) | [Hide Daily Maxima](#) | [Hide Statistics](#) |

Add Year: 84 02 01 00 99 98 97 96 95 94 93 92 91 90 89 88 87 86 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70

Delete Year: 85



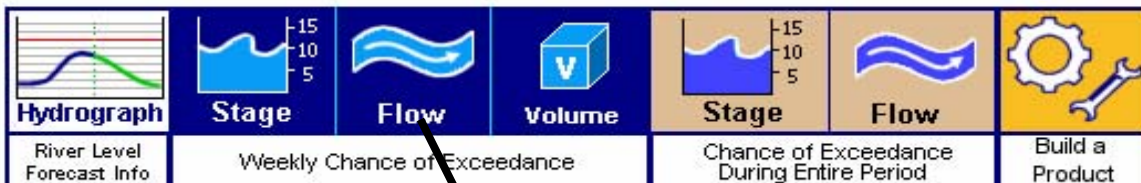
NATIONAL WEATHER SERVICE

Colorado Basin River Forecast Center

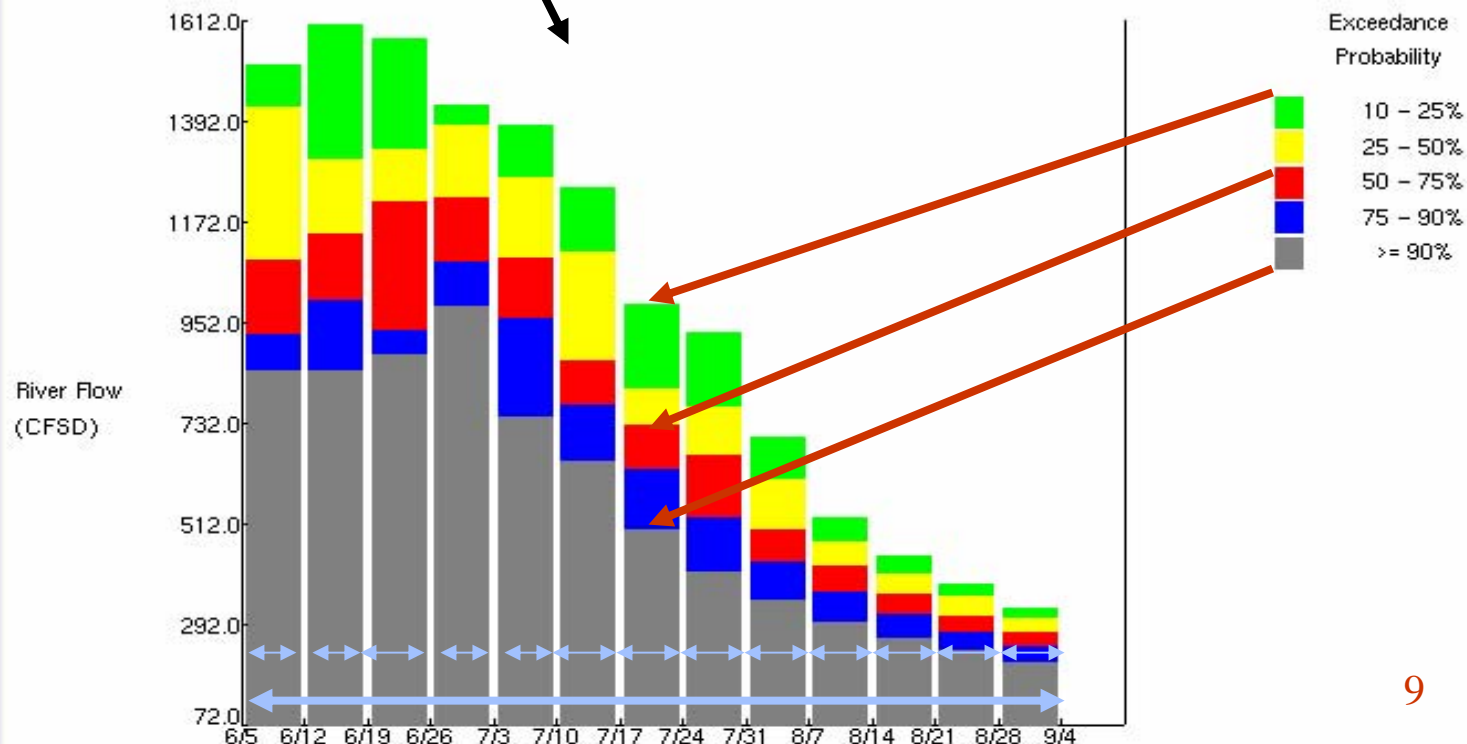
[Home](#)[News](#)[Organization](#)Search

Advanced Hydrologic Prediction Service

[Graphic](#)
[Description](#)
[Operational Prototype](#)
[Concepts](#)

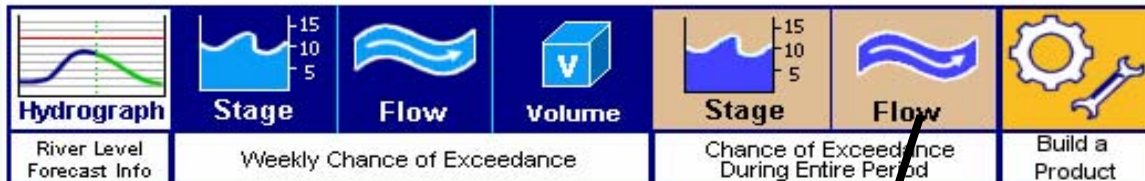
[Back to Main Menu](#)

→ 1 Week Chances of Exceeding River Levels on the GREEN-WARREN BRIDGE
Latitude: 43.0 Longitude: 110.1
Forecast for the period 6/5/2002 - 9/4/2002
This is a conditional simulation based on the current conditions as of 6/5/2002

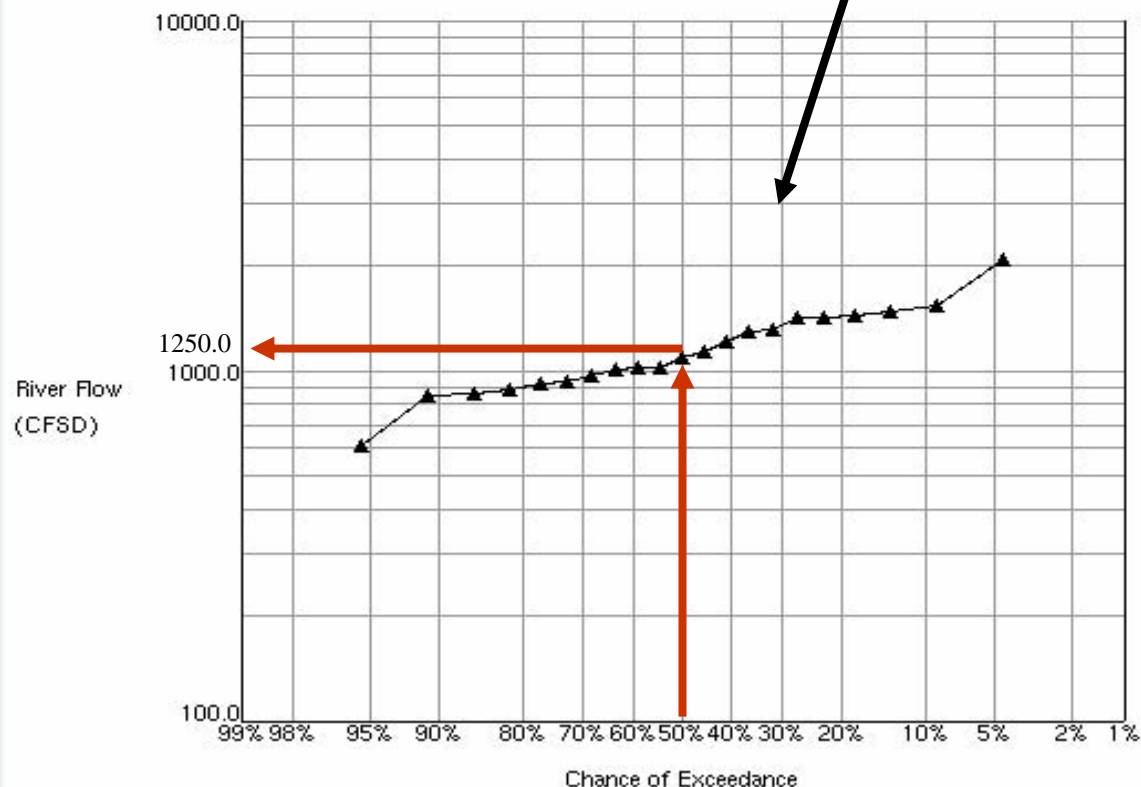


[Home](#)[News](#)[Organization](#)Search [Go](#)**Advanced Hydrologic
Prediction Service**

[Graphic](#)
[Description](#)
[Operational Prototype](#)
[Concepts](#)

[Back to Main Menu](#)

→ Chances of Exceeding River Levels on the GREEN-WARREN BRIDGE at
Latitude: 43.0 Longitude: 110.1
→ Forecast for the period 6/5/2002 – 6/12/2002
This is a conditional simulation based on the current conditions as of 6/5/2002



AHPS

CUSTOMIZED USER PRODUCTS

1. Thousands of Potential Combinations

10 Data Types

3 Model Sources

5 Probability Distributions

4 Weighting Schemes

4 Data Intervals

4 Plot Options

3 Table Options

2. Provide Users Ability to Produce Customized Forecasts/Presentations



AHPS

BUILD YOUR OWN AHPS/ESP PRODUCT



Developed by Steve Shumate-DOH



AHPS / ESP Trace Analysis

1 Select a Location:

SPRAGUE RIVER - BEATTY (BTY03)

2 Select an Accumulation Type:

Mean ☒
Minimum ☐
Maximum ☐
Summation ☐

3 Select an Interval:

Day ☒
Week ☐
Month ☐
Entire Period ☐

4 Select a Starting Date:

Month: Jun Day: 16 Year: 2005

5 Select an Ending Date:

Month: Sep Day: 16 Year: 2005

6 Select a Plot Option and Generate:

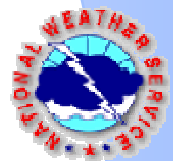
☒ Traces ☐ Probability ☐ Expected Value ☐ Exceedance

Generate a Plot

or Select a Table Option and Generate:

☒ Forecast Info ☐ Quantiles ☐ Flood Quantiles

Generate a Table

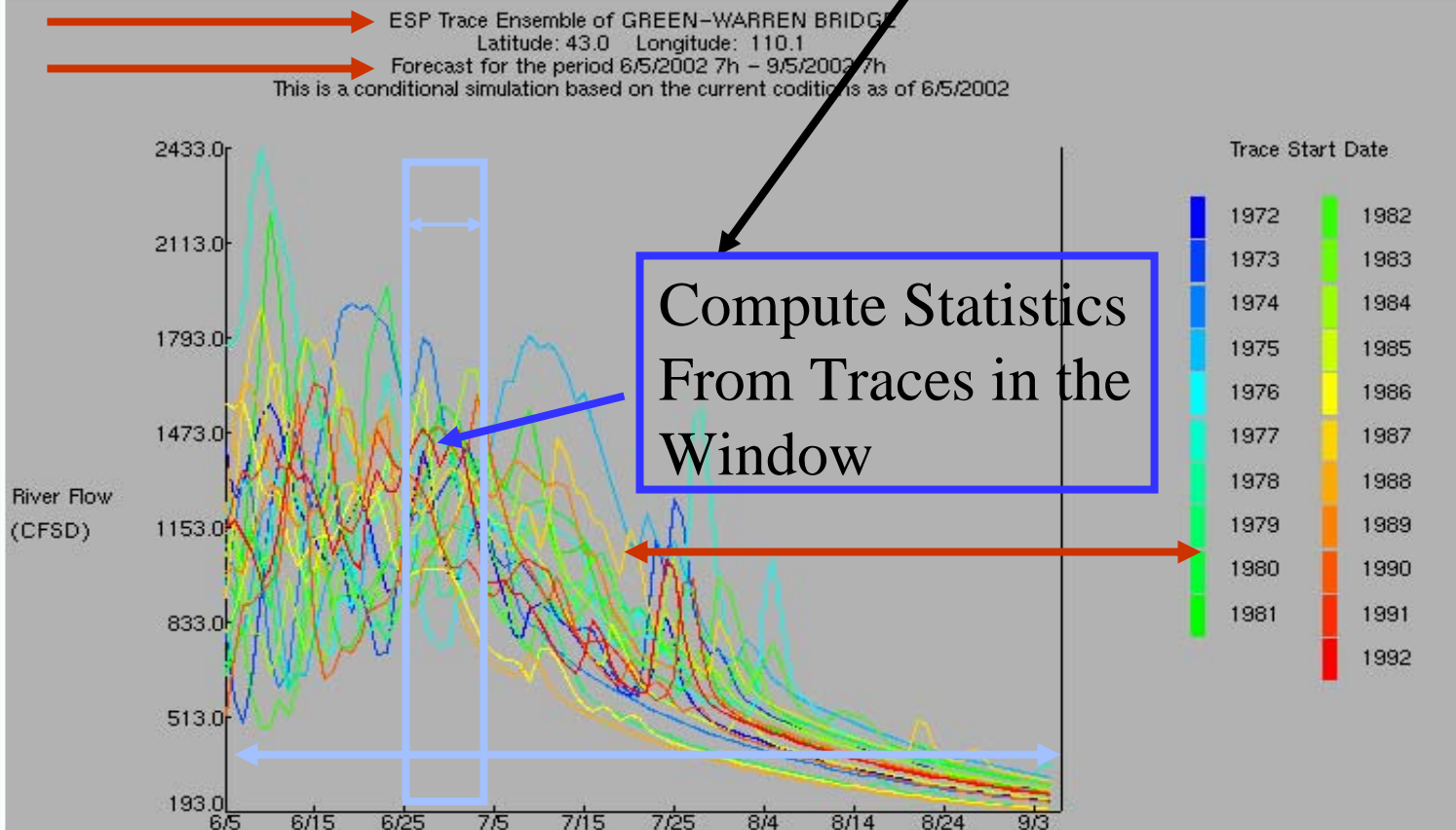
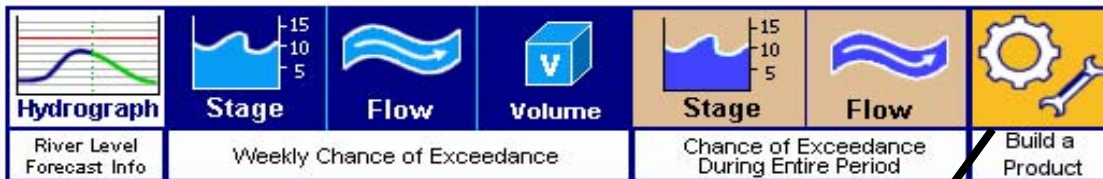




Colorado Basin River Forecast Center

[Home](#)[News](#)[Organization](#)Search [Go](#)**Advanced Hydrologic
Prediction Service**

[Graphic](#)
[Description](#)
[Operational Prototype](#)
[Concepts](#)

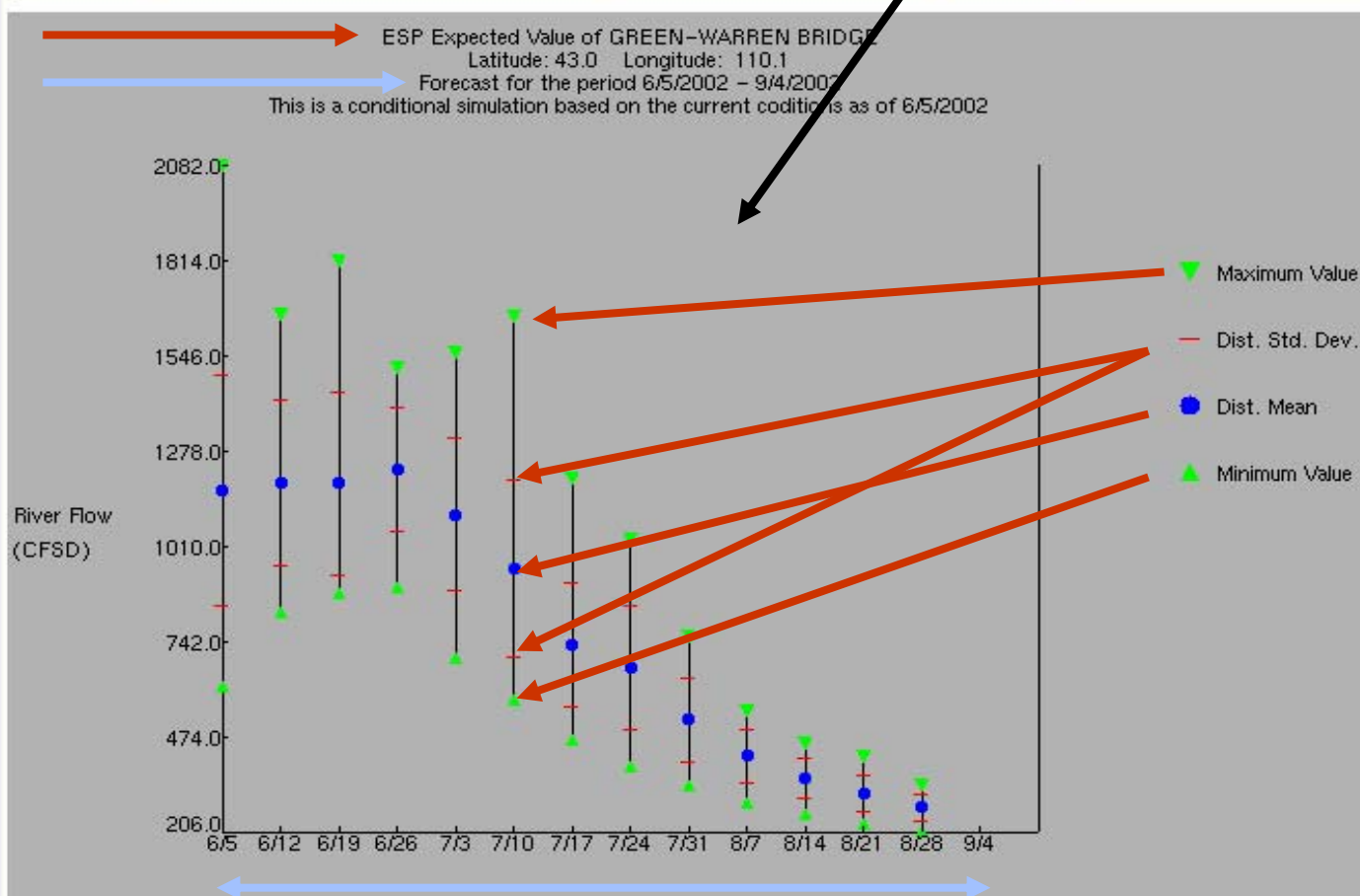
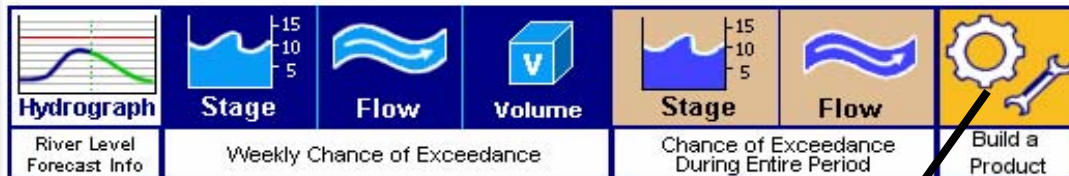
[Back to Main Menu](#)



Colorado Basin River Forecast Center

[Home](#)[News](#)[Organization](#)Search [Go](#)**Advanced Hydrologic
Prediction Service**

[Graphic](#)
[Description](#)
[Operational Prototype](#)
[Concepts](#)

[Back to Main Menu](#)


```

NVRN5 NVRN5L_F.SIM24.SQME.24.CS Navaajo 24hr Conditional.
GBRW4 GBRW4R_F.SIM24.SQME.24.CS Fontenelle 24hr Conditional.
xxxxx GBRW4R_F.SIM24.SQME.24.HS Fontenelle 24hr Historical.
WBRW4 WBRW4H_F.SIM24.SQME.24.CS Green - Warren Bridge 24hr Cond.
||TE|| TraceEnsemble=WBRW4H_F.SIM24.SQME.24.CS
xxxxx WBRW4H_F.SIM24.SQME.24.HS Green - Warren Bridge 24hr Hist.

```

```
# ESP Forecast Information
```

```
#
```

```
# Analysis Period: 5/6/2002 24 - 12/6/2002 24 (MST)
```

```
# Forecast Parameters: River Flow (Max) - (CFSD)
```

```
#
```

```
# Forecast Interval: 1 Month
```

```
# Forecast Point:
```

```
#
```

```
#
```

```
#
```

TEXT OUTPUT

0.90 0.75 0.50 0.25 0.10 Units

	0.90	0.75	0.50	0.25	0.10 Units
05/01/2002 - 05/31/2002	-999.00	-999.00	-999.00	-999.00	-999.00 (CFSD)
06/01/2002 - 06/30/2002	1094.29	1247.01	1380.99	1679.17	1793.95 (CFSD)
07/01/2002 - 07/31/2002	846.34	942.42	1176.40	1339.09	1754.95 (CFSD)
08/01/2002 - 08/31/2002	309.09	357.09	455.17	573.03	790.22 (CFSD)
09/01/2002 - 09/30/2002	182.06	206.78	264.84	314.11	341.17 (CFSD)
10/01/2002 - 10/31/2002	135.45	159.84	180.79	225.60	320.62 (CFSD)
11/01/2002 - 11/30/2002	108.67	125.45	140.12	158.11	175.40 (CFSD)

And Always Remember !

Customers and Users

**Number 1
Priority !**

